

✓ STS-113 Run 1

*3025690 *

OCT 21

PROCESSING OPERATIONS CONTROL OMI PLANNING SHEET



Wad Number S6444-J04-R01	SITE PAD-A FR	Elem CD V	End Item 105 FLT: 019	DATE: 10/19/2002 TIME: 10:09:31
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Title: SSV ICE AND DEBRIS ASSESSMENT	Sub Element/Zone 30
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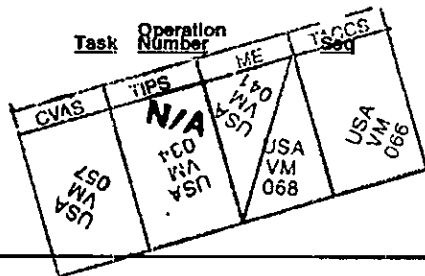
Project Work Order No.	Hazard: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SFOC Safety N/A WC 150 USA OCT 21 '02	<input type="checkbox"/> Local Copy <input checked="" type="checkbox"/> Firing Room Copy
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Authorizing Document VPL519	Material & Equipment: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	MICR Req'd <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	OMRS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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PERFORM THE FOLLOWING:

Pre-Ops Setups

Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps
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OPS Support

Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps
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Operating Instructions

Task	Seq	Steps	Task	Seq	Steps
	010			080	
	015			090	
	020			100	
	030			110	
	040			120	
	050			130	
	060			140	
	070			150	

Post Ops

Task	Operation Number	Seq	Steps
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Appendices

Task	Seq
N/A	

Subtask WAD's












N/A

Planner LISA RUTKOWSKI	WC 150 USA OCT 21 '02	Ext 0746	QC Closure	Date OCT 4 '02	Page 1 OF 1
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2nd Review
DEC 4 '02

USA VM 075

OMI TASK CLOSEOUT CHECKLIST

MI No. <i>56444 J-04</i>	Run No. <i>1</i>	Task Control No. (TCN) <i>3025690</i>	
Start Date <i>10-29-02</i>	Completion Date <i>11-14-02</i>	Closure Date  DEC 4 02	
1. Deviation Index: Verify total number of deviations agree with index. Verify entry is correct into OMI.		QC/Eng.	Date
		<i>FOR ETOS</i>  	<i>11-21-02</i> DEC 4 02
2. Constraints: Verify all constraints are cleared. <i>Subtask of 50007</i>  25 NOV 02		N/A	
3. IPR's: Verify that all IPR's are closed or upgraded to problem reports or dispositioned as no constraint to OMI closure and incorporated in central IPR system and a copy of the central IPR sort attached.			25 NOV 02
4. Verify that material and equipment requirement list enclosed (if applicable).		N/A	
5. OMI: Verify that all pages or verification sheets are completed, stamped, and dated in the lower left/right hand corners.		<i>FOR ETOS</i>  	<i>11-21-02</i> DEC 4 02
6. OMI: Verify that all miscellaneous documents/procedures have sequence number referenced and stamped; e.g., photos, sample results, etc.		<i>FOR ETOS</i>  	<i>11-21-02</i> DEC 4 02
7. Planned task/OMI satisfactorily completed. OPR: <i>R Brewer</i> <i>11-14-02</i>		<i>FOR ETOS</i>  	<i>11-21-02</i> DEC 4 02

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SPRINT, 2004

SSV ICE AND DEBRIS ASSESSMENT

Element/End Item: ALL
Flow/Usage: ET-103 & SUBS
Facility: LC 39
Design Center Concurrence: MSFC,JSC
Category: B
OPR: ETM
TTL ORG: SE

**This document contains
HAZARDOUS operations.**

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1.0 INFORMATION

1.1 Objective

Provide necessary tasks that document, monitor and evaluate ice and debris conditions to eliminate or minimize debris concerns of the integrated SSV during ET tanking, FRF, launch, and associated detanking.

Description

1. This OMI is performed as subtask to S0007/S0014/S0037.
2. This OMI provides documentation of ice/debris activities:
 - A. Pre-launch icing briefing
 - B. Pre-launch debris inspection
 - C. Countdown - Based timeline evaluation monitoring of ET TPS surfaces using OTV
 - D. OTV monitoring of seal/flange areas for cryogenic leakage
 - E. SSV OTV monitoring for debris conditions during countdown
 - F. Cryogenic replenish inspection for evaluation of SSV and facility debris concerns or anomalies
 - G. Evaluation of concerns/anomalies in the event of ET detanking
 - H. Review of engineering film data for SSME ignition, launch, ascent, ET separation, and orbiter landing.
3. Orbiter landing debris information is contained in the NASA publication for Ice and Debris Assessment. That report is referenced in this OMI for continuity of debris data.

1.2 Special Instructions All Operations

1. This OMI is run as a subtask to OMI's S0007, S0014, and S0037. All PAD clearing and controlled access operations will be performed per those OMI's.
2. Constraints will be statused by controlling OMI's S0007/S0014/S0037.
3. The OTV camera numbering scheme for PAD A/B is OXX/1XX.
4. Task Team Leader assignment: NASA PH-H is TTL for L-20 Hour Walkdown, Final Inspection, and Post Launch/Drain Walkdown. ETM is TTL for all other operations.
5. From time stable replenish mode starts until start of final SCAN, scanning with individual cameras should be performed approximately once per hour.
6. Cameras 061/161, 063/163, and 070/170 may be released to NASA select with CICE concurrence.
7. All personnel participating in final inspection and post drain walkdown shall be current in following training:
 - A. Emergency PAD egress
 - B. Fire fighting
 - C. ELSA
8. Milestones:
 - A. MLP portion of post launch walkdown commences at approximately T + 1 hours.
 - B. PAD acreage portion of the post launch walkdown commences at approximately T + 2 hours. (may be deferred until preferred daylight hours.)
 - C. Post drain walkdown commences at approximately T + 4 hours after drain initiated (typically 1 1/2 hours after LH₂/LO₂ low level sensors dry).
9. Hands-on investigation required for all ET-TPS defects suspected of violating NSTS 08303 ice/debris inspection criteria.
10. From time launch scrub is declared until 1.5 hours past time LH₂/LO₂ low level sensors read dry, OTV camera scanning shall be performed approximately once per hour.

11. OTV cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171 shall be used to monitor LO₂/LH₂ tank drain operations.
12. Excessive vapors are defined as being more severe than that described in NSTS 08303 - Ice/Debris Inspection Criteria or NSTS 16007 - Launch Commit Criteria - Hazardous Gas Subsystem.
13. Quality coverage is not required for performance of this OMI. Ref SFOC-GO0007, Ice and Debris Team Operations are exempt from quality coverage. The ROR (CTIF) performs the CMQC function for all non-hazardous operations.
14. Personnel using Sony DKC-ID1 camera shall verify lithium ion battery is securely locked in the bayonet fitting and the lithium button battery door is securely locked and taped in place.
15. Verify camera flash is deactivated.
16. Personnel using Kodak DC 50/120 camera shall verify alkaline batteries are properly installed.
17. Personnel using digital cameras shall not operate in H₂ leak or O₂ rich environment (23 percent or greater).
18. Personnel using the Sony MVC-FD91 camera shall verify the lithium ion battery is securely locked and the battery door is locked closed. Personnel shall verify that both battery doors (lithium ion and lithium button) are closed and taped shut.
19. Personnel shall verify that cameras and equipment are securely tethered when at the PAD while the SSV is present.

1.3 Operations List

Operation		Shop/ Cntl Rm Console	OPR	Haz (Y/N)	Duration (Hrs)
No.	Title				
10	Support Preparations	STM/ FR2	ETM	N	0.2
15	IR Camera Setup	PH-H/ NA	ETM	N	4.0
20	Ice Prediction Briefing	SE/ NA	ETM	N	0.5
30	Pre-launch Walkdown	SE/ NA	ETM	N	2.0
40	Ice Frost Debris Console Initial Configuration Setup	SE/ FR2	ETM	N	3.0
50	SSV Debris Assessment	SE/ FR2	ETM	N	18.0
60	Group 1 Monitoring LO2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
70	Group 2 Monitoring - LH2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
80	Final Inspection	SE/ FR2	ETM	Y	3.0
90	LO2/LH2 Drain Monitoring	SE/ FR2	ETM	N	4.0
100	Console Securing	SE/ FR2	ETM	N	0.5
110	Summary Tape	SE/ FR2	ETM	N	18.0
120	Post Drain Walkdown	SE/ NA	ETM	Y	2.0
130	Post Launch Walkdown	SE/ NA	ETM	Y	3.0
140	Film Review	SE/ NA	ETM	N	15.0
145	IR Camera Removal	PH-H/ NA	ETM	N	2.0
150	Final Report	SE/ NA	ETM	N	0.5

2.0 SAFETY INFORMATION

2.1 Hazards

Operation

1. Working at unprotected heights.
2. Walkdown at PAD while SSV is in stable replenish mode.

2.2 Safety Requirements

Operation

1. If lightning activity is forecast to be within 5 miles of launch PAD, CTC and SFOC safety shall implement provisions of adverse/severe weather and lightning policy contained in GSOP 5400 Ground Safety Operations Procedures.
2. There are no safing/shutdown or evacuation steps required in this OMI.
3. Hazardous operations within this subtask OMI will not be started until safety concurrence to proceed has been given per the integrated OMI controlling this subtask.

2.4 Reference Safety Documentation

Number	Rev	Title
KHB 1710.2	LI	KSC Safety Practices Handbook
GSOP 5400	LI	Ground Safety Operating Procedures

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3.0 STAGING REQUIREMENTS

3.1 Referenced Engineering Documentation

3.1.2 Documents (Auto Build Section)

3.1 Referenced Engineering Documentation

3.1.2 Documents

OPERATION 120

Document No.	Rev	Title
NSTS 08303	(LI)	NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA

3.2 Parts, Materials, Equipment, and Special Tools

3.2.5 Shop Support Materials

OPERATION 15

Part No./Find No.	Nomenclature	Qty	Unit
8305-00-519-3144	Rymple cloth	2	roll
6810-00-543-7915	Isopropyl alcohol	8	ounces

OPERATION 145

Part No./Find No.	Nomenclature	Qty	Unit
8305-00-519-3144	Rymple cloth	2	roll
6810-00-543-7915	Isopropyl alcohol	8	ounces
6505-00-133-8025	Petroleum Jelly, Vaseline (or equivalent)	1	tube/jar

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SEAMS, 003

3.2.8 Personal Protective Equipment

OPERATION 15	Nomenclature N-Dex nitril gloves chemical splash goggles face shield
OPERATION 30	Nomenclature safety harness lanyard
OPERATION 80	Nomenclature safety harness lanyard Nomex coveralls with gloves and hoods ELSA
OPERATION 120	Nomenclature safety harness lanyard hardhats flame retardant coveralls
OPERATION 130	Nomenclature safety harness lanyard hardhats flame retardant coveralls
OPERATION 145	Nomenclature N-Dex nitril gloves chemical splash goggles face shield

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4.0 PLANNING REQUIREMENTS

OIR Required Yes [], No [X]

4.3 LPS Requirements

4.3.1 Computer Systems

PC GOAL
CCMS Configuration
CDS
CMS

4.4 Support Services, Commodities, and Equipment

4.4.2 Communications

(Per controlling OMI S0007, S0014 or S0037 unless specified otherwise)

4.4.3 OTV

(Per controlling OMI S0007, S0014 or S0037 unless specified otherwise)

OTV Cameras required: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

OTV Cameras to be recorded: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

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4.4.4 Countdown Display/Status

<u>Display Required</u>	<u>Bldg</u>	<u>Room</u>	<u>Operation Time</u>
Timing	LCC	FR2	Duration of Test
Countdown and GMT	LCC	FR2	Duration of Test

4.4.8 Services

SGS Organization
LS

Operation/Step
10-2

COMM Organization

Operation/Step

COMM	10-1
COMM	50-6
COMM	60-1
COMM	60-3
COMM	60-6
COMM	60-9
COMM	60-11
COMM	70-1
COMM	70-3
COMM	70-6
COMM	70-9
COMM	70-10
COMM	70-11
COMM	90-2
COMM	90-4
COMM	100-2

4.4.12 Propellants, Gases and Chemicals

<u>Commodity</u>	<u>Spec No.</u>	<u>Quantity</u>	<u>Rcvr</u>	<u>Location</u>	<u>Minimum Press</u>	<u>Delivery Time</u>
GN ₂	SES-0073 -6.3-5	Min 750 Cu ft	PH-H 861-3645	Pad 39B Camera Site 2	3000 PSI	1 week prior to T-0

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5.0 CONFIGURATION ACCOUNTING AND VERIFICATION

5.1 Specific OMRS Requirements Satisfied by this TOP

OMRS NO.	NOMENCLATURE/ EFFECTIVITY	SEQ-STEP (CAP)
S00E00.021	ET TPS MON DURING DETANK	90-005
	L01 TAF;C	
SC0E00.031	POST DETANK ET TPS INSPECT	120-002
	L01 TAF;C	
S00FA0.900	PRELAUNCH WEATHER BRIEFING (L-1 DAY)	20-001
	L01 VAF1-90	
S00FB0.005	ET TPS SURFACE MONITORING	50-024
(1)	L01 T23,27-29,31-999	
S00FB0.350	MONITOR GO2 VENT HOOD	50-026
(1)	L01 VAF1-90	
S00FB0.360	MONITOR ET/ORB MPS FOR LEAKAGE	50-024
(1)	L01 VAF1-90	
S00L00.150	HIGH WIND ET NOSE INSPECTION	50-022
	L01 SAF;C	
S00U00.010	POST LAUNCH SHUTTLE/PAD AREA INSPECTION	130-002
(1)	L01 SAF1-999	
S00U00.011	ENGR REVIEW & ANALYSIS OF LAUNCH FILM	140-001
(1)	L01 SAF1-999	
S00U00.020-A	ENGINEERING PAD INSPECTION	80-002
(1)	L01 SAF1-999	
S00U00.020-C	INSPECT ORBITER AFT ENGINE	80-002
(1)	L01 SAF1-999	
S00U00.020-D	INFRARED SURVEILLANCE	80-002
(1)	L01 SAF1-999	
S00U00.030	PRELAUNCH SHUTTLE/PAD AREA INSPECTION	30-001
(1)	L01 SAF1-999	

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03-15-2002

5.5 List of References

OPERATION 20

Reference No.	Rev	Title
NSTS 16007	(LI)	NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F

OPERATION 30

Reference No.	Rev	Title
80901019010	(LI)	ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

OPERATION 40

Reference No.	Rev	Title
79K24576	(LI)	OTV System Installation, LC 39, Pad A
79K24522	(LI)	OTV System Installation, LC 39, Pad B

OPERATION 50

Reference No.	Rev	Title
SPI SP-519	(LI)	OMI and OM Implementation
SFOC GO0007	(LI)	Quality Planning Requirements Document (QPRD)

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OPERATION 10 Support Preparations

Shop: STM
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.2

10-1 STM JYVO 138

Verify PAD OTV system is configured to support S6444 as scheduled.

Support: COMM

10-2 STM JSTC 111
JSTC *SCB 114

Verify eight 10-minute ELSA's available at complex J for use by Final Inspection Team (ref S0007/S0014/S0037).

Support: LS

10-3 STM TBC 136

Operation - Support Preparations complete.

*** End of Operation 10 ***

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OPERATION 15 IR Camera Setup

Shop: PH-H
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 4.0

WARNING

Hard hats required on the Pad when SSV is not present.

CAUTION

Exercise care to avoid dropping equipment, fasteners, etc from RSS Roof to prevent damage to equipment or injury to personnel. All tools must be tethered.

NOTE

IR Camera installation at RSS Roof site may be not performed if IR Camera already installed or if technical concerns preclude such.

15-1 Install IR camera at RSS Roof Site as follows.

1. **Rotate** camera housing back cover to open position by removing bolts with flat washers (20 pl). **Retain** bolts/washers for reinstallation.
2. **Remove** camera housing front cover by removing fasteners (2 pl). **Reinstall** fasteners after cover removal. **Retain** cover for reinstallation after IR Camera Unit removal.
3. **Install** IR Camera Unit into camera housing. **Secure** IR Camera Unit in housing by locking spring pin at lower, left.

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WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow opened back cover to exert undue force on cables once cables have been connected.

4. **Connect:**
 - OTV coaxial cable
 - Pan & tilt cable
 - Controller cable
 - Power cable
5. **Rotate** camera housing back cover into closed position. **Secure** back cover by installing bolts/flat washers (20 pl). **Tighten** bolts wrench tight.

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WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear N-Dex nitril gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 05-22-01

6. **Clean** IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol.
7. **Perform** functional checkout of IR Camera Unit using local controller if required at Task Team Leader (TTL) discretion.



Sub Step Not Performed: NA

NASA PH-H [Signature] Date 10-29-02
M. Phynel

USA ETM R Brewer Date 10-29-02

Not Performed: N/A

0 EIC 
NOV 15 '02

FOR ETOS
11-16-02 
NOV 23 02 
NOV 2 02

NOTE

IR Camera installation at Camera Site 2 may be not performed if IR Camera already installed or if technical concerns preclude such.

15-2 Install IR camera at Camera Site 2 as follows.

1. **Rotate** camera housing back cover to open position by removing eight ea bolts using Phillips screwdriver. **Retain** bolts/washers for reinstallation.
2. **Remove** camera housing front cover by removing securing bolt(s). **Reinstall** bolt(s) after cover removal. **Retain** cover for reinstallation after IR Camera Unit removal.
3. **Install** IR Camera Unit into camera housing. **Secure** IR Camera Unit in housing by tightening set screw(s) wrench tight at lower left/right.

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

4. **Connect:**
 - OTV coaxial cable
 - Pan & tilt cable
 - Controller cable (2 pl)
 - Power cable
5. **Rotate** camera housing back cover into closed position. **Secure** back cover by installing bolts (8 pl). **Tighten** bolts using Phillips screwdriver.

03-15-2002
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WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear **N-Dex nitril gloves** and **chemical splash goggles**. When working at eye level or above wear a **face shield** over goggles.

WS002.a 05-22-01

6. **Clean** IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol .
7. **Perform** functional checkout of IR Camera Unit using local controller if required at Task Team Leader (TTL) discretion.

Sub Step Not Performed: N/A

NASA PH-H M. Payne Date 10-29-02
USA ETM R Brewer Date 10-29-02

Not Performed: N/A

*** End of Operation 15 ***

① EIE
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NOV 15 02

ET
05

NOV 15 02

①
NOV 15 02
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342



E. Cary Ralston
Vice President and
RSRM Program Manager

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November 9, 2002
E600-CY02-397

George C. Marshall Space Flight Center
National Aeronautics & Space Administration
Marshall Space Flight Center, AL 35812

Attention Mr. M. U. Rudolphi, MP51

Gentlemen:

Subject: RSRM-86/STS-113 Transmittal of L-24 Hour PMBT Prediction

This letter officially transmits the L-24 hour propellant mean bulk temperature (PMBT) predicted for STS-113, scheduled for launch on November 11, 2002. The PMBT at the time of launch is predicted to be 77°F which is within the 44° to 86°F requirement. This PMBT prediction is also valid for November 12, 2002.

Very truly yours,

Joni Endicott for
E. C. Ralston

ECR:JBE/mp

cc: T. Boardman, L00
J. Burn, LD0
S. Eden, E68
J. Endicott, E68
K. Foulger, E62
S. Henderson, LF0
M. Kahn, A10
C. Ralston, E00
R. Roth, Thiokol/MSFC
D. Ruddell, E68

D. Burton, K68
S. Cash, MP51
T. Shaffner, Thiokol/KSC
B. St. Aubin, Thiokol/KSC
P. Teehan, KSC-SK
D. Wood, MP51

Plus Fax List

* CALLED IN AT 18:45 Hrs.
\$0000, VII, STEP 15-0381-
R Brewer
11-09-02

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11/09/02

03-15-2002
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OPERATION 20 Ice Prediction Briefing

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

Ref: NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F defines the ET No-Ice Zone.

20-1 CICE

Conduct L-1 day ice prediction briefing with launch director.

PH-H Signature

P. Olin 11/10/02
P. Olin

OMRSD S00FA0.900

USA

20-2 Operation - Ice Prediction Briefing complete.

*** End of Operation 20 ***

① EIE
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STARS, 218

OPERATION 30 Pre-launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD
Hazard (Y/N): N
Duration (Hrs): 2.0

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

NOTE

This operation is performed at approximately L-20 hours. When this operation is performed in support of a 24 hour scrub turnaround, the preceding launch scrub post drain walkdown and this pre-launch walkdown may be performed concurrently.

Inspections may also be performed from the RSS, GO₂ Vent Arm (GVA), -Y OWP, or +Y OWP if still extended and accessible.

Ref: 80901019010 (LI) ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are optional walkdown participants.

NASA Engr	(4)
SFOC Engr	(2)
LMSSC - LSS	(1)
Boeing - LSS	(1)
SRB ELE	(1)
Thiokol - LSS	(1)

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OMI S6444 J04
APPROVED

30-1 Debris inspection team **perform** walkdown of SSV and MLP per following:

1. Team leader **verify** S6444 pre-test briefing complete.
2. **Assemble** following essential personnel

NASA PH-H Engineering - 1
SFOC ETM Engineering - 1
3. **Inspect** following areas (as a minimum) from the MLP, RSS and FSS to identify/ resolve potential debris sources.

Areas to be inspected

- A. Launch vehicle external surfaces
 - Orbiter
 - SRB's
 - External Tank
- B. MLP surfaces
 - LH and RH SRB holddown posts
 - Deck including deck bolts, fixtures, and edge gutters
 - SSME LH and RH SRB exhaust openings, and sound suppression (SS) troughs
 - TSM's and camera housings
4. Ref Table 30-1, **document** and SIM Photograph SSV and Launch PAD Configuration.

Description: Pre launch walkdown.

OMRSD S00U00.030-1

2-25

SPC No. 51113

Disc/Frame Nos: 1-25

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135 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401
LH ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401

215 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces from FSS	Vertical	35-70 mm	
LH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
RH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
Jack Pad C/O's	Horizontal	35-70 mm	Flash needed (1 each C/O)
LO ₂ Ogive Cable Tray	Vertical	35-70 mm	From RSS roof

255 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces with GO ₂ vent ducts in view	Vertical	35-70 mm	
GO ₂ vent ducts	Horizontal	250 mm	

*** End of Table 30-2 Photo Requirements for SSV and Launch Pad Configuration

*** End of Operation 30 ***

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OMI S6444 J04
APPROVED

- 30-2 **Record** all facility discrepancies in S0007. Submit copy to PAD leader and **notify** TBC/CTC. **Verify** no constraints to continue. **Forward** description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

PH-H ^{A. OLIV} *A. Oliv* Date 11/9/02

ETM *R. Brewer* Date 11/9/22

- 30-3 Operation - Pre-launch Walkdown complete.

03-15-2002
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Table 30-1 Photo Requirements for SSV and Launch Pad Configuration

Photos from MLP			
<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET -Z	Vertical	28 mm	
Aft Dome	Horizontal	28 mm	
Aft Dome	Horizontal	35-70 mm	
LH SRB from North	Horizontal	35-70 mm	All water troughs in view
LH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
LH SRB from East	Vertical	35-70 mm	
RH SRB from North	Horizontal	35-70 mm	All water troughs in view
RH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
RH SRB from West	Vertical	35-70 mm	
SRB Heater Elec T-0	Horizontal	35-70 mm	Foam intrusion; May need flash
North HDP	Vertical	35-70 mm	Representative view
South HDP	Vertical	35-70 mm	Representative view
TSM T-0 LH ₂	Vertical	35-70 mm	Flash needed
TSM T-0 LO ₂	Vertical	35-70 mm	Flash needed
Orbiter Left & Right Wing	Vertical	35-70 mm	From below ET (1 Photo each wing)

03-15-2002
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OMI S6444 J04
APPROVED

03-15-2002
10:00 AM

OPERATION 40 Ice Frost Debris Console Initial Configuration Setup

Shop: SE
Cntrl Rm Console: **FR2**
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 3.0

NOTE

The next step sets up the photo processing laptop for use in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Network or equipment failures on the photo processing machine shall be annotated below.

40-1 Configure computer to perform image processing, analysis, and recording:

1. **Connect** following equipment at Ice/Frost console:
 - power cable to computer
 - "Dazzle" capture card to laptop parallel port
 - "Y" adapter to laptop PS2 port
 - keyboard to keyboard port on "Y" adapter
 - mouse to mouse port on "Y" adapter
 - monitor to laptop
2. **Insert** Xircon Network Card into Personal Computer PCMCIA port.
3. **Connect** ethernet (gray) cord to Xircon Network Card.
4. **Remove** terminator from video cable.
5. **Plug** BNC-to-RCA adapter into end of video cable.
6. **Plug** video cable into "Dazzle" DVC "video in".
7. **Power-up** Trouble Console VCR.

03-15-2002
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OMI S6444 J04
APPROVED

8. Log-on to KSC Ground Ops. Click-on Start/Programs/Dazzle.
9. Confirm above equipment as operational and record results.

Results NORMAL OPS - NO PROBLEMS

ETM

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11-10-02

NOTE

The next step verifies the setup of the infrared scanners. This is not a constraint to set up of the ice console. IR scanner condition shall be annotated below.

- 40-2 Verify IR scanner operation condition, annotate below.

RSS:

Ready

CS 2:

Ready

NOTE

The next step verifies the operation of console monitors in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Equipment condition shall be annotated below.

- 40-3 Verify console condition by powering on monitors and tape recorders.

Monitors:

✓

Tape recorders:

✓

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03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

ET OTV pre-mapping/initial position of cameras may be performed in random order.

Ref: 79K24576 (LI) OTV System Installation, LC 39, Pad A and
Ref: 79K24522 (LI) OTV System Installation, LC 39, Pad B define OTV camera locations.

FOV designates field-of view. RSS and -Y OWP must be retracted for completion of pre-mapping.

Pre-mapping steps/substeps in the remainder of this operation need not be performed if supporting a scrub turnaround and if performed during a previous run.

It is preferred to record all pre-mapping scanning on a single tape. However, multiple tapes may be used when lighting/ launch countdown constraints necessitate such.

40-4 CVM1 JTV1 223

Perform OTV pre-mapping of External Tank exterior surfaces using OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, and 067/167 as follows:

- **Insert** designated pre-map tape into trouble console VCR.
- **Punch-up** camera number on trouble monitor.
- **Start** recording on pre-map tape. **Record** start time (GMT).
- **Scan** from top-to-bottom, left-to-right and right-to-left at approximately full zoom-in.
- **Stop** recording on pre-map tape. **Record** stop time (GMT).
- **Record** data in Table 40-1.
- **Repeat** with each OTV camera listed until each has been used to scan the External Tank.
- **Remove** pre-map tape from trouble console VCR.

ETM

Wollam
WOLLAM

Date

11/10/02

Not Performed: *NA*

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

40-5 CVM1 JTV1 223

Position OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 070/170, and 071/171 to initial positions as defined in Table 40-2.

ETM Mark Wollam Date 11/10/02
Wollam
Not Performed: N/A

ET
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03-15-2002
APPROVED

OMI S6444 J04
APPROVED

OPRARS, 023

Table 40-1 ET Pre-Mapping Data			Tape # <u>518</u>
OTV Camera	Start Time (GMT)	Stop Time (GMT)	ET 05 11-10-02
004 / 104	17:59	18:30 03:24	FOR ET 05 OPRARS
009 / 109	19:12	19:27	
013 / 113	17:51	18:07	
033 / 133	18:08	18:25	
042 / 142	19:26	19:40	
054 / 154	18:35	18:49	
055 / 155	18:54	18:59	
056 / 156	18:48	18:57	
060 / 160	18:59	19:16	
061 / 161	17:36	18:48	
062 / 162	17:42	17:55	
063 / 163	17:25	17:50	
064 / 164	18:12	18:32	
065 / 165	18:25	18:37	
066 / 166	18:22	18:40	
067 / 167	18:29	18:51	

Notes: CAM 60 will not focus.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 40-2 OTV Camera Initial Positions

OTV Camera	Initial Position
004 / 104	FOV centered on GUCP
009 / 109	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 063/163 and 064/164.
013 / 113	Full zoom in. View ^N SW GO ₂ Vent Louver area. <i>100 P/V ET 05 11/10/02</i>
033 / 133	FOV perpendicular to ET and with LO ₂ -to-Intertank splice at frame top and LH ₂ -to-Intertank splice at frame bottom. Then tilt down until XT2058 is in frame center.
042 / 142	FOV centered on Orbiter Access Arm-to-Orbiter interface.
054 / 154	FOV to encompass approximately 3 feet forward of XT2058 to 2 feet aft of XT2058. Orbiter wing and SRB should be in view at frame left.
055 / 155	Set FOV on north bridge LH ₂ pipeline flange.
056 / 156	FOV with LH ₂ Aft Dome in frame bottom and XT2058 in view at frame top.
060 / 160	Full zoom in. View SW GO ₂ Vent Louver area.
061 / 161	Full zoom-in. Adjust FOV until ET LO ₂ -to-Intertank splice is centered vertically and view is perpendicular to ET. Pan right until edge of the ET comes into view. Note: LO ₂ Tank may pass out-of-view.
062 / 162	Full zoom in. View NW GO ₂ Vent Louver area.
063 / 163	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 064/164.
064 / 164	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 063/163.
065 / 165	Full zoom out. Set FOV on aft part of ET with frame bottom approximately 2 feet below LH ₂ Aft Dome.
066 / 166	FOV perpendicular to ET with LO ₂ -to-Intertank splice at frame top. Then tilt down until Orbiter RH Wing/SRB intersection is in frame lower right.
067 / 167	Set FOV with LH ₂ Aft Dome toward frame bottom and 2 nd black ring of SRB in view.
070 / 170	Select down wind camera of these two as wide angle view of the SSV.
071 / 171	Set up wind camera for close-up view of SSME's.

ET
05

11/10/02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

40-6 Operation - Ice Frost Debris Console Initial Configuration Setup complete.

ETM May Date 11/10/02
Miller → MARK
WOLLAM

*** End of Operation 40 ***



03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
03-15-2002

OPERATION 50 SSV Debris Assessment

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Steps in this operation are contingent upon progression of launch countdown operations and may not be performed if countdown is terminated.

Entire Operation Not Performed: NA

NOTE

Until otherwise indicated, all times are referenced to S0007, S0014 or S0037 timelines.

No operations/steps within this subtask OMI may be performed as a stand-alone procedure. This OMI may only be performed as a subtask to S0007/S0014/S0037.

NOTE

Ref: SPI SP-519 (LI) OMI and OM Implementation and Ref: SFOC GO0007 (LI) Quality Planning Requirements Document (QPRD), following step complies with requirements for ROR-as-CMQC function.

50-1

CTIF	TBC
TBC	CMQC 136

Notify TBC that CTIF will perform the CMQC function for STS 113, S6444 run 1. Request TBC notify CMQC that the ROR-as-CMQC option will be exercised for STS 113, S6444 run 1.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-2

CTC	TBC	232
TBC	CTIF	136

Perform OTV and ice/frost monitoring area setups.

ETM Mark G. Williams Date 11/10/02
WILLIAM

50-3

CTIF	TBC	136
TBC	CTC	
CTC	STM	232

Verify Operation 10- Support Preparations complete.

ETM Mark G. Williams Date 11/10/02

50-4

CTIF

Verify Operation 20 - Ice Prediction Briefing and Operation 30- Pre-launch Walkdown complete.

ETM Mark G. Williams Date 11/10/02

2004-10-10
10:10:10

50-2

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-5

CTIF CVM1 222
CVM1 222

Verify:

- All OTV cameras are on, tapes in recorder, and ready to commence OTV scanning, monitoring, and recording.
- Trouble tape recorder is ready.
- Ice Frost Debris Console Initial Configuration Setup complete.

ETM *Mark Miller* Date 11/10/02

50-6

CTIF CICE 222
CVM1
CVM2
GIPC
CTIF JYVR 138
CVM1 JTV1 223
CVM2 JTV2 225

All personnel participating in OTV operations **report** test ready status.

ETM *Mark Miller* Date 11/10/02
Mullins

Support: COMM

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-7

CTIF	TBC	136
TBC	CTC	232

Ice Frost Console Area Setups for OTV scanning complete.
Report readiness.

ETM M/B plus Date 10/10/02
MULLINS

Not Performed: N/A

50-8

CTIF CVM1 222

From start of LO₂ chilldown until seal deflation/GO₂ vent hood retraction, **monitor** the +Y/-Y GO₂ vent seal-to-ET interface for seal fretting and continuous GO₂ escape.

OMRS S00FB0.350-1

ETM ME 08 Date 11-10-02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
11:27

NOTE

GO₂ vent seal fretting could induce damage to ET SOFI. Continuous GO₂ venting could result in formation of ice in the no ice zone (ref NSTS 16007). Ultimate decision to lift the vent hood rests with CMEC.

50-9

CTIF TBC 136
CMEC

If +Y/-Y GO₂ vent seal fretting or continuous GO₂ escape detected from start of LO₂ chilldown until seal deflation, **notify CMEC** for GO₂ vent hood removal.

ETM  Date 11-10-02

Not Performed: N/A

50-10

CTIF CIPC 222

Monitor wind speed and direction from start of LO₂/LH₂ chill down through launch/scrub. CIPC **notify** CTIF if winds measured at 38 knots or greater from North +/-30 degrees as measured at 60 feet.

ETM  Date 11-10-02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Excessive vapors are defined as being more severe than those described in NSTS 08303 (LI) NSTS Program Ice/Debris Inspection Criteria or NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem.

50-11

CTIF CVM1 222
CVM2

From start of LO₂/LH₂ loading until Prepressurization
(LO₂ at T-2M55s and LH₂ at T-1M57s):

1. Monitor following ET-Orbiter MPS areas for leakage:
 - LO₂ Feedline (portion external to the Intertank)
 - LH₂ Feedline
 - LH₂ Recirculation Line
 - LH₂ Aft Dome Manhole Cover(s)
 - ET-Orbiter LO₂/LH₂ Umbilical Disconnects
 - LH₂ T-0 Umbilical
 - LO₂ T-0 Umbilical
2. Verify no visible cryogenic liquid or excessive vapors.

OMRS S00FB0.360-1

ETM



Date 11-10-02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

50-12

CTIF CVM1 222
CVM2

Monitor and videotape following ET TPS surface areas and GO₂ Vent Area during LO₂/LH₂ loading through Prepressurization (LO₂ at T-2M55s and LH₂ at T-1M57s):

- LH₂ Aft Dome
- LH₂ Barrel
- Intertank (external)
- LO₂ Tank
- GO₂ Vent Area
- Protuberances

OMRS S00FB0.005-1

ETM

ME
08

Date 11-10-02

Not Performed: N/A

50-13

CTIF CVM1 222

Perform Operation 60 - Group 1 Monitoring.

ETM

ME
08

Date 11-10-02

Not Performed: N/A

50-7

1002

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-14

CTIF CVM2 222

Perform Operation 70 - Group 2 Monitoring.

ETM

ME
08

 Date 11-10-02

Not Performed: N/A

50-15

CTIF CVM2 222

Once per hour minimum, after start of LO₂/LH₂ (until LO₂/LH₂ low level sensors read dry), scan LO₂ feed line brackets and flange closeouts per Table 50-1.

ETM

ME
08

 Date 11-10-02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

CHERRY, 823

50-16

CTIF CICE 222

As count proceeds, for concerns/ observations identified:

1. **Record** observation/concern on trouble tape per Table 50-1.
2. **Document** observed condition on Table 50-2, Observation Worksheet.

ETM  Date 11-10-02

Not Performed: N/A

50-17

TBC CTIF 136
CTIF CICE 222

Perform Operation 80 - Final Inspection when called by
S0007/S0014/S0037.

ETM R Brewer Date 11/10/02 ✓

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Final SSV scan typically commences at L-2 hours.

50-18

CTIF CVM1 222
CVM2

Perform final SSV scan.

ETM N/A Date N/A

Not Performed: W. A. Richards
11-11-02

50-19

CTIF CVM1 222
CVM2

At start of T-9 minute hold, **configure** OTV cameras for terminal count.

ETM N/A Date N/A

Not Performed: W. A. Richards
11-11-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

50-20

CTIF

222

Start continuous recording per Table 50-1 at pick-up of T-9 Minute count including following events:

- T-7M30S OAA retraction on camera OTV 008/108 or 042/142.
- T-3M55S Orbiter elevon movement on OTV 009/109, 054/154, 063/163 064/164.
- T-2M30S GOX Vent Seal retraction, +Y / -Y GOX Vent Louvers, and GOX Vent Seal Footprints on OTV 013/113, 060/160, 061/161, 062/162, 068/168, and 069/169.
- T-1M00S through last view of vehicle during ascent on NASA Select (channel 179).

ETM N/A Date N/A

Not Performed: Val P. P. 11-11 ^{Richard}

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Ref: NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem Appendix F - Ice Launch Commit Criteria defines "No-Go Conditions."

50-21

CICE CTIF 222

Verify there are no Ice Launch Commit Criteria "No-Go Conditions" being violated.

ETM R Brewer Date 11/10/02

50-22

If winds are from the north (+/-30 degrees) and are 38 knots (peak as measured at 60 feet above ground) or greater:

1. **Monitor/videotape** nose cone area during high winds.
2. **Verify:**
 - A. No ice formation on the +Y and -Y GO₂ vent seal footprint areas.
 - B. No damage to the ET TPS at the +Y and -Y GO₂ vent seal footprint areas.
 - C. No damage to the +Y and -Y GO₂ vent seals themselves.
 - D. No evidence of GO₂ leakage from +Y/-Y GO₂ vent seals to ET interface.

USC
VM
141
OMRSD S00L00.150

ETM N/A Date N/A

Not Performed:

ET
05

11-10-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-23

CTIF

Verify launch or launch scrub (drain back). Record data.

Launch _____ Scrub ☒

Date 11/10/02 Time 03:14 GMT

Scrub at T- 1.5

ETM R Brewer Date 11/10/02

50-24

CTIF

ET-Orbiter MPS monitoring for leakage and ET TPS Surface Areas
and GO₂ Vent Area monitoring/recording for launch complete.

OMRSD S00FB0.005-1
OMRSD S00FB0.360-1

USA
VA
44

ETM N/A Date N/A

Not Performed;

ET
03

11/10/02

50-13

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03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

When completely filled and drain is initiated, it takes approximately 1 hour until the LH₂ tank low level sensors read dry, and approximately 1.5 hours until the LO₂ tank low level sensors read dry.

50-25

CTIF CVM1 222
CVM2

If launch scrubbed (or drain back declared) after start of LO₂/LH₂ slow fill mode:

- Perform Operation 90 - LO₂/LH₂ Drain Monitoring.
- Record observations/concerns on trouble tape per Table 50-1.
- Document all observations/concerns on Table 50-2 Observation Worksheet.

ETM R Brewer Date 11/11/02

Not Performed: N/A

50-26 CTIF

GO₂ Vent seal to ET interface monitoring for seal fretting and continuous GO₂ escape complete.

OMRSD S00FB0.350-1 ^{USA}_{VM}⁴¹

ETM R Brewer Date 11/11/02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

50-27

CTIF CVM1 222
CVM2

Terminate scanning operations.

ETM R Brewer Date 11/11/02

50-28

CTIF CVM1 222
CVM2

Perform Operation 100 - Console Securing.

ETM R Brewer Date 11/11/02

50-29

CTIF

If LO₂/LH₂ tanking started, perform Operation 110 - Summary
Tape.

ETM R Brewer Date 11/11/02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Following step may be not performed at CTIF discretion.

50-30 CTIF TBC 136
 TBC STM

If Post Drain Walkdown to occur at night, **request** PAD xenon lighting be maintained/activated for duration of walkdown.

Not Performed: N/A

NOTE

Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

50-31

CTIF

If launch scrubbed after start of LO₂/LH₂ tanking, **perform** Operation 120 - Post-Drain Walkdown.

ETM R Brewer Date 11/10/02

Not Performed: N/A

50-32

CTIF

If launch occurred, **perform** Operation 130 - Post launch Walkdown.

ETM N/A Date N/A

Not Performed: ET/05
11/11/02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

50-33

CTIF

If launch occurred, **perform** Operation 140 - Film Review.

ETM N/A Date N/A

Not Performed:

ET
05
11/11/02

50-34

SSV Debris Assessment complete.

50-17

002

OMI S6444 J04
APPROVED

1.	CTIF	CVM1 CVM2	222	Locate anomaly/concern on pertinent OTV(s)
2.	CTIF			Punch-up pertinent OTV on trouble monitor. Update trouble tape log in table below.
3.	CTIF			Start the trouble tape.

Trouble tape shall be allowed to run until sufficient OTV documentation of observation/concern has been made. OK to change OTV's while trouble tape is running.

- | | | |
|---|------|--|
| 4 | CTIF | After observation/concern has been documented on the trouble tape, stop the trouble tape. Update trouble tape log below. |
|---|------|--|

[illegible]

SPARS, 836

TROUBLE TAPE RECORDING LOG

STS-113 S0007

DATE: 11-11-02

TAPE NO.	CAM. NO.	START TIME (GMT)	STOP TIME (GMT)	DESCRIPTION OF ANOMALY/CONDITION
#01	004	21:45:00	21:46:00	BSR on GHz beat line
	054	22:00:00	22:01:30	L02 F/L SCAN
	054	23:00:00	23:03:23	L02 F/L SCAN + LOWGAIN
	054	00:00:00	00:02:48	L02 F/L SCAN + LOWGAIN
	054	01:00:00	01:04:00	L02 F/L SCAN
	063	01:25:01	01:26:36	L02 VIBS + Sniffer + Vapors
	009	01:38:00	01:39:00	SNIFER REMOVED
	054	02:15:00	02:18:00	L02 F/L SCAN/ER
	034	03:13:00	03:14:00	L02 F/L SCAN
	054	04:54:00	05:05:00	L02 F/L SCAN
	054	06:06:00	06:09:00	L02 F/L SCAN

Notes:

ET 116
ORB 105
SRB B114
MLP 2
PAD A

PAGE NO. 1

03-15-2002
APPROVED

OMI S6444 J04
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Table 50-1 Observation Documentation Procedure

[illegible]

*** End of Table 50-1 Observation Documentation Procedure ***

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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

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OMI S6444 J04
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03-15-2002

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

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03-15-2002, 03:07

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____

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OBSERVATION DOCUMENTATION

Observation No. _____

Observed By: _____

Date _____ Time 11 / 00 GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF Date

OMI S6444 J04
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OBSERVATION DOCUMENTATION

CTF _____ Date _____

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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____

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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

*** End of Table 50-2 Observation Worksheet ***

*** End of Operation 50 ***

03-15-2002
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03-15-2002
04:48

OPERATION 60 Group 1 Monitoring LO₂ Chill Down Thru T-0

Shop: SE

Cntrl Rm Console: FR2

OPR: ETM

Zone: NA

Hazard (Y/N): N

Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before LO₂ Chill Down commences.

Operation Not Performed: NA

NOTE

This operation monitors LO₂ Ogive and Barrel and associated components/ areas from start of Chill Down through T-0 via OTV cameras 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164,

OTV cameras 013/113 and/or 062/162 will view -Y GO₂ Vent Hood Seal at all times. At no time will both cameras be positioned away from the -Y GO₂ Vent Hood Seal.

OTV cameras 068/168 and 069/169 view SW and NE GO₂ Vent Areas respectively. These are fixed FOV cameras and do not have pan, tilt, etc. capability.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

03-15-2002
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APPROVED

LO₂ Chill Down To L-2 Hour Mark

60-1 CVM1 JYVR 138

At start of vehicle LO₂ Chill Down, **start** recorders for cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169.

ETM Tom Ford Date 11-10-02

Support: COMM

60-2 Record LO₂ MPS Chill Down start date and time (GMT).

LO₂ MPS Chill Down Date 11-10-02 GMT Time 21:29 GMT

ETM Tom Ford Date 11-10-02

60-3 CVM1 JTV1 223

From start of LO₂ Chill Down until start of LO₂ Fast Fill on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169 **monitor/videotape** ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM Mark Wollen Date 11/10/02
WOLAM

Support: COMM

Not Performed: NA

03-15-2002
APPROVED

OMI S6444 J04
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STARS, 003

60-4 Record LO₂ Slow Fill start date and time (GMT).

LO₂ Slow Fill Date 11/10/02 GMT Time 22:06 GMT

ETM Mark Weller Date 11-10-02 11-K

Not Performed: NA

60-5 Record LO₂ Fast Fill start date and time (GMT).

LO₂ Fast Fill Date 11-10-02 GMT Time 22:18 GMT

ETM MIS 18 Date 10 Nov 02

Not Performed: NA

60-6 CVM1 JTV1 223

From start of LO₂ Fast Fill until LO₂ stable replenish mode is established, monitor/videotape ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. Scan LO₂ Tank. Alternate cameras and scan from Intertank to LO₂ Barrel Splice to GO₂ Vent Hood. No cryogenic liquid or excessive vapors allowed.

ETM Mark Weller Date 11/10/02

Support: COMM

Not Performed: NA

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

60-7 Record LO₂ Topping date and time (GMT).

11-11-02
LO₂ Topping Date ~~11-10-02~~ GMT Time 0019 GMT

ETM MS 16 Date 10 Nov 02

Not Performed: NA

60-8 Record LO₂ Stable Replenish mode start date and time (GMT).

LO₂ Stable Replenish Date 11-11-02 GMT Time 0025 GMT

ETM MS 16 Date 10 Nov 02

Not Performed: NA

60-9 CVM1 JTV1 223

From time LO₂ Stable Replenish mode is established until time for final SSV scan (approximately L-2 hours), **monitor, scan and videotape** ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. No cryogenic liquid or excessive vapors allowed.

ETM Monahan Date 11/10/02

WOLLAM

Support: COMM

Not Performed: NA

03-15-2002
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OMI S6444 J04
APPROVED

03-15-2002

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

During Final SSV Inspection Scan the camera lights on OTV cameras 061/161 and 062/162 shall be turned "Off" when view passes over the Orbiter cockpit to preclude "distracting" the Flight Crew.

60-10 CVM1 JTV1 223

Perform Final SSV Inspection Scan with OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164. Scan passes shall view entire SSV with cameras at approximate full zoom in during final scan.

ETM

NA

Date

11/10/02

MARK WOLLA

Not Performed:

MAN

ET
05

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11/11/02

03-15-2002
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OMI S6444 J04
APPROVED

Terminal Count Camera Positions

NOTE

This step performed for SSME ignition only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute count. Cameras must be positioned for ignition no later than T-9 minutes. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM1 camera positions for SSME ignition are defined in Table 60-1.

60-11 CVM1 JTV1 223

Ref Table 60-1, position cameras 004/104, 013/113, 042/142, 054/154, 060/160, 062/162 for terminal count.

ETM

N/A

Date

11/10/02

Support: COMM

Not Performed:

CMV

ET 105 11-11-02

60-12 Operation - Group 1 Monitoring - LO₂ Chill Down Thru T-0 complete.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

Table 60-1 CVM1 Camera Positions for Terminal Count

NOTE

This Table defines CVM1 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition non-sequentially.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

The GO₂ Vent Arm (GVA) retracts at T-2m30s.

CVM1 Camera Positions Are Defined As Follows:

004/104

GUCP centered in frame so that GUCP will stay in view throughout SRB "twang".

042/142

At approximately T-1 hour, view and monitor Orbiter access arm while Orbiter hatch is being closed.

At T-7m30s, watch Orbiter access arm retract, then view bipod strut in center of frame, LO₂ feedline fairing in top of frame, and Orbiter hatch in right of frame.

054/154

At T-3m50s, view Orbiter right hand body flap movement, then zoom out with Orbiter/ET umbilicals at approximate frame center, Orbiter trailing edge at frame bottom, and edge of +Y (RH) SRB just in view at frame right.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 60-1 CVM1 Camera Positions for Terminal Count

013/113

At T-2m30s, watch lift of GO₂ vent arm for debris and nose cone/vent louvers for ice damage. Immediately following lift of GO₂ vent arm, center frame on GO₂ vent louver and then zoom-out so that entire ET movement is seen during SRB 'twang' at SSME ignition.

060/160

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the GO₂ vent louver. After CICE concurrence, go full zoom out and position camera with SSV centered and ET nose cone at frame top.

062/162

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the -Y GO₂ vent louver. After CICE concurrence, zoom out until ET nose spike is at top of frame with ET centered.

061/161

At approximately T-4m00s, verify camera lights are off. Then position camera to view astronaut closing visor at T-2 minutes 00 seconds.

068/168 and 069/169

Immediately after GO₂ vent hood lift, turn lights off to preclude distracting orbiter crew when the GVA rotates to its latchback position.

063/163

SRB AND ORBITER WING IN VIEW CENTERED OVER LH2 FIREDETECTION SYSTEM (BUTCHER PAPER)

*** End of Table 60-1 Camera Positions for Terminal Count ***

*** End of Operation 60 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

OPERATION 70 Group 2 Monitoring - LH₂ Chill Down Thru T-0

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before start of LH₂ Chill Down.

Operation Not Performed: NA

NOTE

This operation monitors LH₂ Barrel and associated components/areas start of LH₂ Chill Down to pre-pressurization via OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

LH₂ Chill Down To L-2 Hour Mark

70-1 CVM2 JYVR 138

At start of LH₂ Chill Down, **start** recorders for cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

ETM Mark Wollan Date 11/10/02
Wollan Support: COMM

70-2 Record LH₂ Chill Down start date and time (GMT).

LH₂ Chill Down Date 11/10/02 Time 21:29 GMT

ETM Mark Wollan Date 11/10/02

70-3 CVM2 JTV2 225

From start of propellant loading until start of LH₂ Fast Fill on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, **monitor/videotape** ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM Tom Ford Date 11.10.02

Support: COMM

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

70-4 Record LH₂ Slow Fill start date and time (GMT).

FORETOS
11-10-02 *80* NOV 10 02
LH₂ Slow Fill Date *21:40* Time *21:40* GMT

FORETOS
OR 04
ETM *Tom Ford* Date *11-10-02*

FORD
Not Performed: *N/A*

70-5 Record LH₂ Fast Fill start date and time (GMT).

FORETOS
OR 04
LH₂ Fast Fill Date *11-10-02* Time *22:20* GMT

ME
OR
ETM _____ Date *11-10-02*

Not Performed: *N/A*

70-6 CVM2 JTV2 225

From start of LH₂ Fast Fill until stable replenish mode is established, scan LH₂ Tank. Alternate OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167 and scan/videotape from LH₂ Aft Dome to Intertank.

ME
OR
ETM _____ Date *11-10-02*

Support: COMM

Not Performed: *N/A*

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

70-7 Record start date and time (GMT) for LH₂ Topping.

LH₂ Topping Date 11-10-02 Time 23:29 GMT

ETM ME
08 Date 11-10-02

Not Performed: N/A

70-8 Record LH₂ Stable Replenish mode start date and time (GMT).

LH₂ Stable Replenish Date 11-10-02 Time 00:03 GMT

ETM ME
08 Date 11-10-02

Not Performed: N/A

70-9 CVM2 JTV2 225

During LH₂ Stable Replenish mode and until time for final scan (approximately L-1.5 hours), on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, **monitor/videotape** ET TPS surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, and TSM LH₂/LO₂ Umbilicals. No cryogenic liquid or excessive vapors allowed.

ETM ME
08 Date 11-10-02

Support: COMM

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final SSV Inspection Scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

70-10 CVM2 JTV2 225

Perform Final SSV Inspection Scan with OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 064/164. Scan passes shall view entire SSV with cameras at full zoom in during final scan.

ETM N/A Date N/A

Support: COMM

Not Performed: ME
08
11-10-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

T-9 Minute Terminal Count

NOTE

Next step performed for terminal count only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute terminal count. Cameras must be positioned for SSME ignition no later than T-9 minutes. 'Spot' scanning after pick-up of the T-9 minute terminal count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM2 camera positions for terminal count are defined in Table 70-1.

70-11 CVM2 JTV2 225

Ref Table 70-1, position cameras 009/109, 033/133, 056/156, 065/165, 066/166 061/161, 070/170, 071/171 and 067/167 for terminal count.

ETM N/A Date N/A

Support: COMM

Not Performed:

ME
08

11-10-02

70-12 Operation - Group 2 Monitoring - LH₂ Chill Down Thru T-0 complete.

03-15-2002
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OMI S6444 J04
APPROVED

03-15-2002
03-15-2002

Table 70-1 - CVM2 Camera Positions for Terminal Count

NOTE

This Table defines CVM2 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

The Orbiter access arm (OAA) retracts at T-7M30S. Orbiter body flap movement occurs at T-3m50s.

Cameras may be positioned for SSME ignition non-sequentially

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

03-15-2002
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OMI S6444 J04
APPROVED

Group 2 Camera Positions Are Defined As Follows:

033/133

Full zoom out. LO₂ feed line in frame center and MLP deck at bottom.

055/155

View ET aft dome with MLP deck just out of view at bottom, ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

056/156

View ET aft dome with MLP deck just out of view at bottom. ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

065/165

Full zoom out. SSV centered. MLP deck edge just in view at bottom.

066/166

ET centered. Intertank to LO₂ Barrel splice at frame top with the majority of Orbiter wing in view.

067/167

Center on GUCP for optimum view.

070/170 and 071/171

At T-9m00s, zoom in on space shuttle main engine with camera providing best view. Zoom out on SSME for wide angle view with other camera.

009/109

At approximately T-3m50s, position to view Orbiter body flap and elevons movement. Afterwards, center on LH₂ umbilical with -Y vertical strut at frame top.

061/161

At approximately T-1m30s, tilt-up to GO₂ Vent Footprint. Zoom in. Pause. If footprint is acceptable, zoom out and tilt down to view Orbiter nose/cockpit through liftoff.

***** End of Table 70-1 - CVM2 Camera Positions for Terminal Count *****

***** End of Operation 70 *****

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OMI S6444 J04
APPROVED

03-15-2002, 04:08

OPERATION 80 Final Inspection

Shop: SE

Cntrl Rm Console: FR2

OPR: ETM

Zone: PAD A/B

Hazard (Y/N): Y

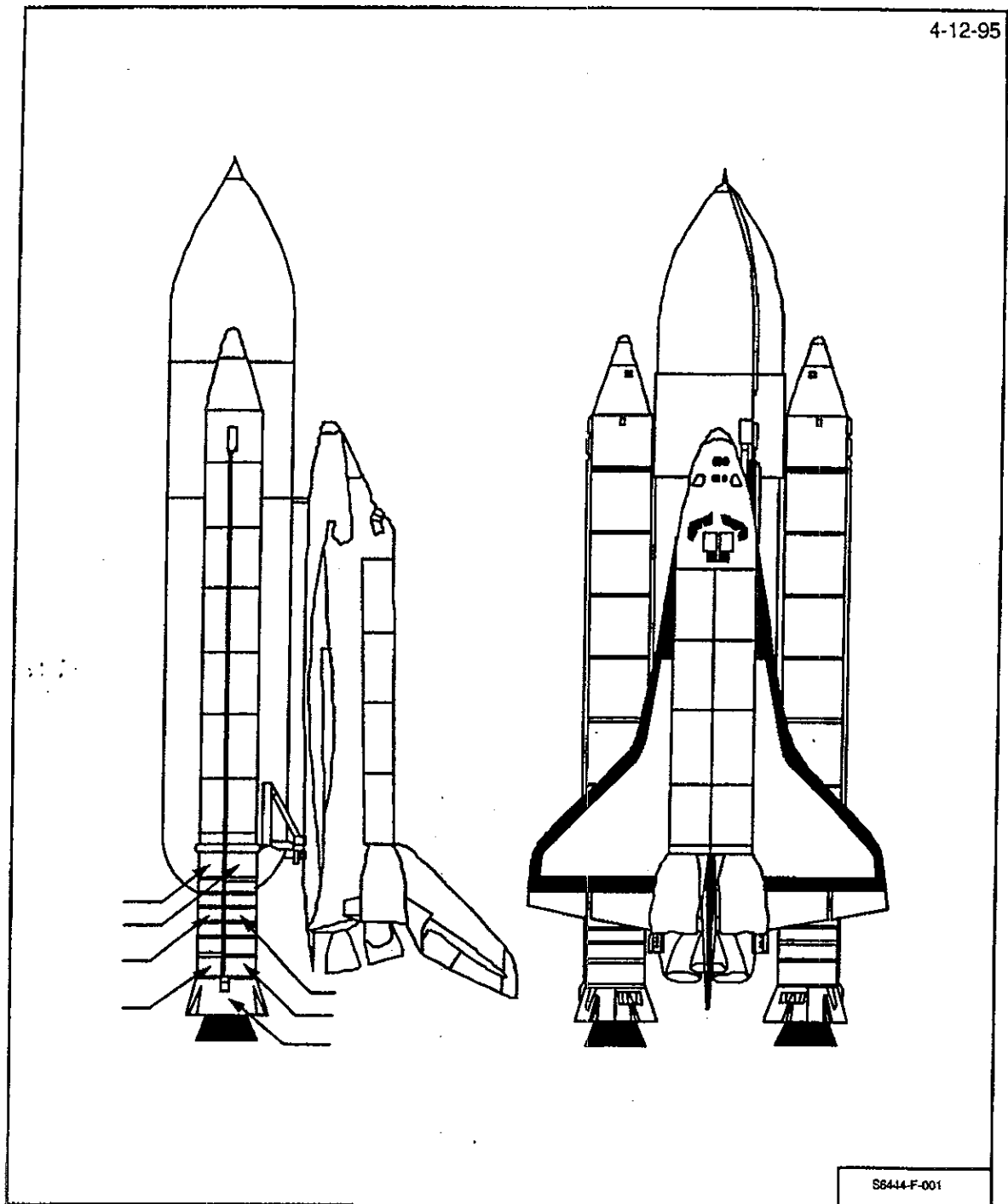
Duration (Hrs): 3.0

NOTE

Final Inspection may not need to be performed depending on LO₂/LH₂ tanking and launch countdown, as determined by CTC/TTL.

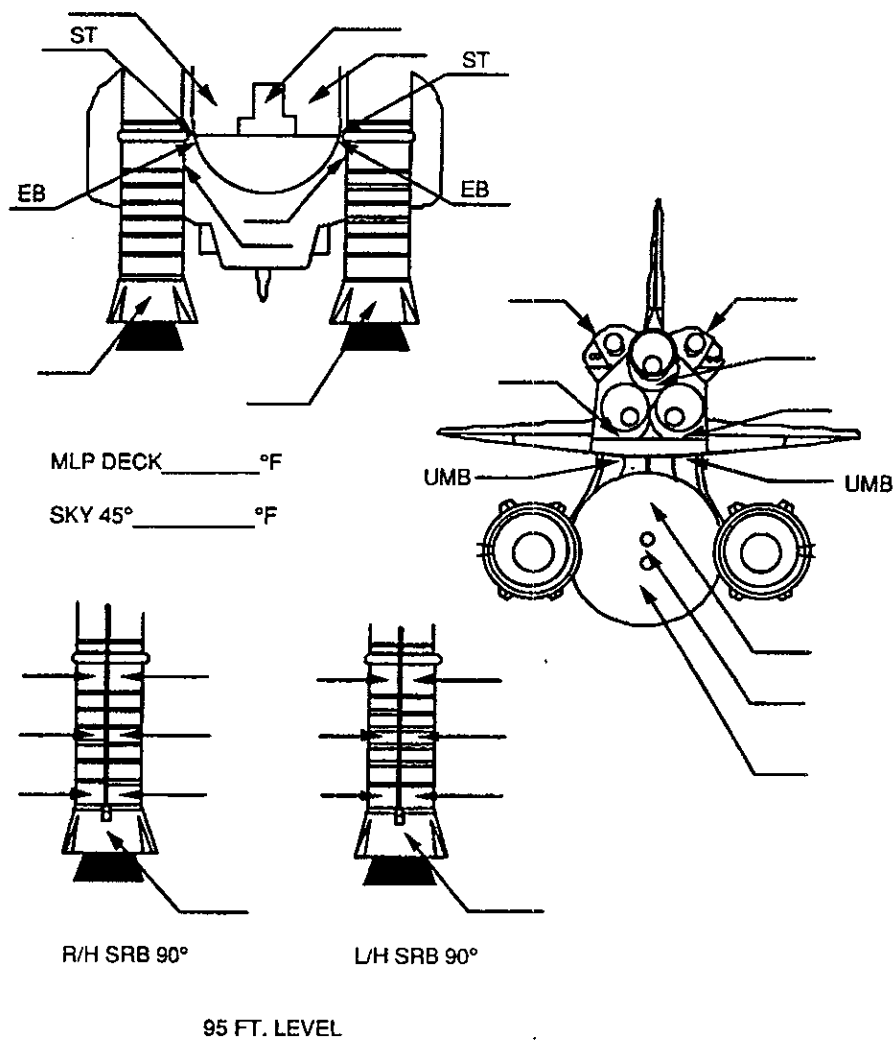
Final Inspection Team stay time guidelines for each level are given in Table 80-1. These guidelines are for reference only and may be deviated from at PICE discretion.

Operation Not Performed: N/A



**Figure 80-1: Deck (0) Level
(For Reference Only)**

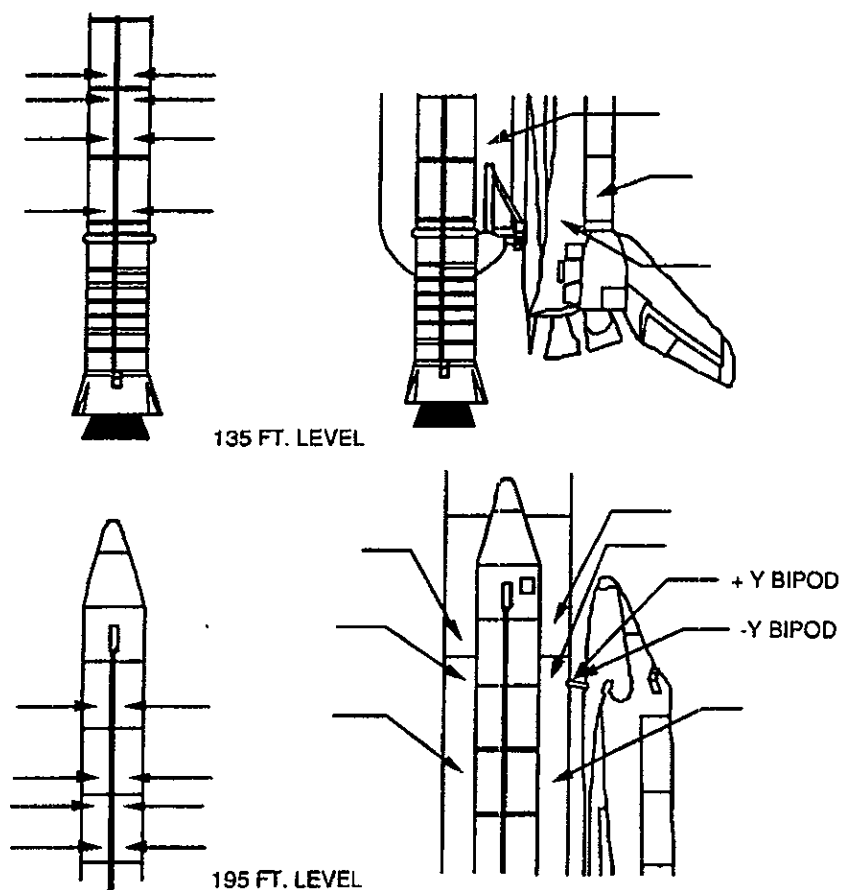
4-13-95



S6444-F-002

Figure 80-2: Deck (0) and 95 Ft Levels
(For Reference Only)

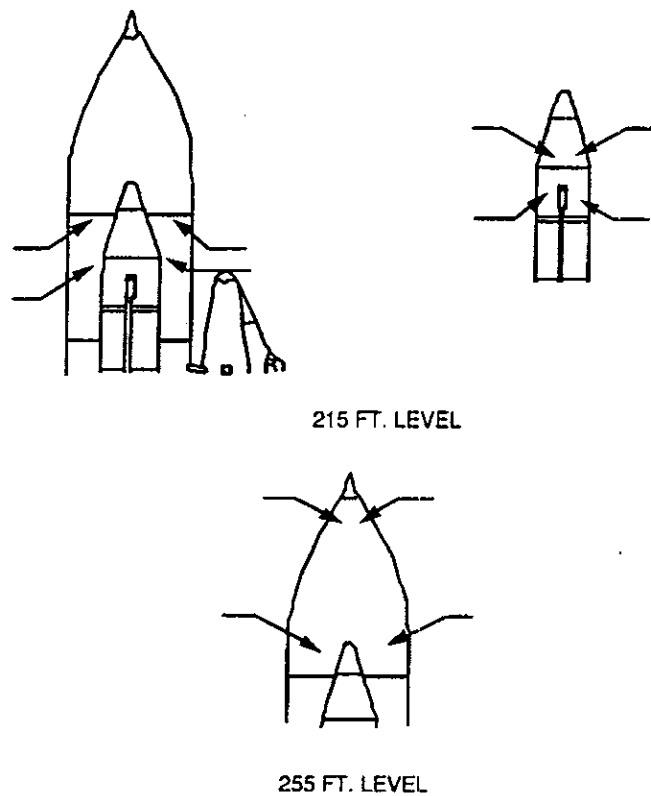
4-12-95



S6444-F-003

**Figure 80-3: 135 and 195 Ft Levels
(For Reference Only)**

4-12-95



S6444-F-004

**Figure 80-4: 215 and 255 Ft Levels
(For Reference Only)**

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

WARNING

Personnel performing final inspection shall be attired in **Nomex coveralls with gloves and hoods**. Personnel shall have available gloves, hoods, and **ELSA** at all times during walkdown.

Personnel using Sony DKC-ID1 camera shall verify lithium ion battery is securely locked in bayonet connector and the lithium button battery door is locked and taped in place. Personnel shall ensure the flash is not activated on the camera.

Personnel using Kodak DC-50/120 shall verify alkaline batteries are properly installed and the flash is not active on the camera.

Personnel using digital cameras (Sony DKC ID1, Kodak DC-50/120 shall not use these cameras in the presence of a hydrogen leak or an oxygen enriched atmosphere (readings greater than 23 percent O₂).

NOTE

Task Team Leader (TTL) for final inspection is PH-H. Additional personnel (listed below) may be added to the final inspection team with CTC, Launch Director, and Safety concurrence.

JSC Level II	(1)
PH-H	(2)
SFOC ETM	(1)

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03-15-2002

80-1 Assemble following final inspection team members:

TTL - PH-H	(1)
PH-H	(1)
SFOC ETM	(2)
LMSSC LSS	(1)
SFOC Safety	(1)

80-2 Final inspection team **perform** walkdown of SSV and associated facilities as follows:

NOTE

Following substep may be not performed with TTL concurrence.

Tables 80-2 and 80-3 are reference only items. Images are to be taken of targets of opportunity. Images must be taken with 35 mm and digital cameras. Digital images shall be inputted into SIMS.

1. Ref Tables 80-2 and 80-3, photograph SSV points of opportunity during final inspection using 35 mm. **Record** data.

Roll No.

Negative No.

Work order No.

Sub Step Not Performed:

2. Reference Tables 80-2 and 80-3, **take** digital image of SSV points of opportunity using digital camera.

Description: Final Inspection Team

SPC No. 51114

Disc/Frame Nos: 1-46 / 47-100

3. See Figures 80-1 through 80-4, **measure and record** (deg F) SSV external surface temperatures using IR gun(s)/scanners.

03-15-2002
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OMI S6444 J04
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NOTE

The following substep references inspection areas. However, inspection shall not be limited to these areas. Inspection shall be of entire SSV and specific areas of concern as defined by the TTL, CTC, or Launch Director.

4. Visually inspect:

- Orbiter aft engine compartment external surfaces for condensation and ice formations.
- ET TPS surfaces which cannot be observed by the OTV system.
- Specific areas of concern as determined by the TTL, CTC, or Launch Director.

OMRSD S00U00.020-A-1

OMRSD S00U00.020-C-1

OMRSD S00U00.020-D-1

454
334

80-3 Final Inspection complete. **Verify** no constraints to continue. **Forward** description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

TTL (PH-H)

George Rivera Date *11/10/02*
Rivera

SFOC-ETM

R Brewer Date *11/10/02*
Brewer

80-4 Operation - Final Inspection complete.

ETM

R Brewer Date *11/10/02*
Brewer

ET
05

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80-8

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SPRINT, 603

Table 80-1 Final Inspection Team Walkdown Stay Times

255 Ft Level - 5 Minutes

- LO₂ Ogive and Barrel acreage
- GO₂ Pressurization Line
- LO₂ Tank Cable Tray
- Visible LH SRB surfaces
- GO₂ Vent Ducts

215 Ft Level - 20 Minutes

- ET GH₂ 7 inch Vent Assembly
- ET acreage (between -Z and -Y axis)
- GO₂ vent area
- Orbiter tiles
- Visible SRB surfaces
- Inter tank-to-LO₂ Barrel splice

195 Ft Level - 10 Minutes

- LO₂ Feed Line
- ET/Orbiter Bipods (side and bottom view)
- -Y ET/SRB forward attachment (bottom view)
- -Y ET/SRB aft attachments (top view)
- Inter tank splice areas (LO₂ and LH₂)
- ET acreage (between -Y and +Z axis)
- Orbiter tiles
- Visible LH SRB surfaces

135 Ft Level - 10 Minutes

- LH₂ ET/Orbiter Umbilical
- -Y ET/SRB C/T
- -Y Vertical Strut
- LO₂ Feed Line
- ET acreage between -Y axis and +Z axis
- ET/Orbiter attachments (top view)
- Visible LH SRB surfaces
- Orbiter aft fuselage

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Table 80-1 Final Inspection Team Walkdown Stay Times
0 Level - 30 Minutes

- LH₂ Aft Dome
- ET acreage around +Z axis
- ET acreage around -Z axis
- LO₂ Feed Line
- LH₂ Feed Line
- ET/Orbiter attachments - Bottom view
- ET/Orbiter LH₂ and LO₂ Umbilicals
- T-0 LH₂ and LO₂ Umbilicals
- Space Shuttle Main Engines (SSME)
- Orbiter tiles
- ET/SRB aft attachments
- Visible SRB surfaces
- SRB ignition overpressure sound suppression water troughs

*** End of Table 80-1- Final Inspection Team Walkdown Stay Times ***

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2001102

Table 80-2 Final Inspection Team - Telephotos

TELEPHOTOS - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
GO ₂ Vent Ducts	Horizontal	
LO ₂ Acreage	Vertical	

TELEPHOTOS - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
-Y Bipod Ramp	Horizontal	From RSS
LO ₂ P/L Ice Frost Ramps	Vertical	From RSS; Requires 3-4 shots
GO ₂ Seal/Hood	Horizontal	From haunch & RSS
GUCP	Vertical	

TELEPHOTOS - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
-Y Bipod Ramp & Jack PAD C/O	Horizontal	

TELEPHOTOS - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	
-Y Longeron	Vertical	If needed
Jack Pad Closeouts	Horizontal	
LH ₂ Acreage	Vertical	

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Table 80-2 Final Inspection Team - Telephotos

TELEPHOTOS - MLP

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	From West
LH ₂ UMB	Horizontal	From NW
EB-7	Horizontal	
EB-8	Horizontal	
LH ₂ Aft Dome	Horizontal	
Third Hard Point C/O	Vertical	
LH ₂ Barrel	Horizontal	From North
SSV Overall	Horizontal	From North
SSV Overall	Horizontal	From East
LO ₂ F/L Bracket & Bellows	Vertical	XT-1973
LO ₂ F/L Bracket	Vertical	XT-1871
LO ₂ F/L Bracket	Vertical	XT-1623
LO ₂ F/L Bracket	Vertical	ST-1377 & XT-1129
LO ₂ F/L Bracket & Bellows	Vertical	XT-1129 & XT-1106 from SE
LO ₂ P/L & C/T	Vertical	From SE

600 MM PHOTOS - 255 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
GO ₂ Vent Ducts	1/30	Contingency

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Table 80-2 Final Inspection Team - Telephotos

600 MM PHOTOS - 215 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
-Y GO ₂ Seal	1/30	
-Y Bipod Ramp	1/30	Contingency
Jack Pad C/O's	1/4	Difficult if windy
LO ₂ F/L	1/15	
-Y Vertical Strut (Crack)	1/30	

600 MM PHOTOS - 195 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
-Y Bipod Ramp	1/30	Contingency

600 MM PHOTOS - 135 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
LH ₂ UMB	1/30	
-Y Vertical Strut (Crack)	1/60	
LO ₂ F/L Bellows	1/15	Contingency

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Table 80-2 Final Inspection Team - Telephotos

600 MM PHOTOS - MLP

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
LH ₂ UMB	1/30	From West
LH ₂ UMB	1/30	From NW
LH ₂ UMB	1/30	From East
LH ₂ UMB Actuator C/O	1/15 or 1/30	From North standing next to water pipe
LO ₂ UMB	1/5	Lower Inboard
LO ₂ UMB	1/8	Inboard
LO ₂ F/L Bracket & Bellows	1/15	One photo to include XT-1978 & XT-1973
LO ₂ F/L Bracket	1/15	XT-1871
LO ₂ F/L Bracket	1/15	XT-1623
LO ₂ F/L Bracket	1/15	XT-1377
LO ₂ F/L Bracket	1/30	One photo to include XT-1129 & XT-1106
LO ₂ F/L Bracket	1/30	From SE corner; One photo to include XT- 1129 & XT-1106
Jack Pad C/O's	1/15	From SE corner
Ice Frost Ramps or Pal Ramps	1/15 or 1/30	Contingency
LH ₂ UMB Inboard	1/15	From East
+Y Longeron	1/15 or 1/30	Contingency
-Y Longeron	1/15	Contingency

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SEARS, R. C.

Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ Tank	Vertical	35-70 mm	
GO ₂ Vent Ducts	Horizontal	35-70 mm	

WIDE ANGLE PHOTOS - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Overall GH ₂ Vent Line	Horizontal	35-70 mm	
Orbiter Nose, ET -Y Side	Horizontal	35-70 mm	
Orbiter Nose, ET -Y, +Z Side	Horizontal	35-70 mm	From RSS
Forward Half of Vehicle	Vertical	28 mm	From RSS
Entire Orbiter	Vertical	28 mm	From RSS

WIDE ANGLE PHOTOS - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Aft Part of SSV, LH Wing	Vertical	35-70 mm	
Orbiter Fwd Section, Upper LH ₂ Tank	Vertical	35-70 mm	
Bipod, -Y, +Z Intertank Area	Horizontal	35-70 mm	

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Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Orbiter Aft Section	Vertical	35-70 mm	
Lower LH ₂ Tank & LH SRB	Vertical	35-70 mm	

WIDE ANGLE PHOTOS - MLP

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Overall Orbiter Left Side	Vertical	28 mm	
ET -Y, +Z Quadrant	Vertical	28 mm	
ET -Z Side	Vertical	28 mm	
ET +Y, +Z Quadrant	Vertical	28 mm	
Overall Orbiter Right Side	Vertical	28 mm	
ET Aft Dome	Horizontal	35-70 mm	
-Z Side of LO ₂ T-0; RCS Stinger	Horizontal	35-70 mm	
+Z Side of LO ₂ T-0; RCS Stinger OMS Nozzle	Horizontal	35-70 mm	
-Z Side of LH ₂ T-0; RCS Stinger	Horizontal	35-70 mm	
+Z Side of LH ₂ T-0; RCS Stinger OMS Nozzle	Horizontal	35-70 mm	
Overall SSME Cluster	Horizontal	50 mm	-Y Side
SSME No. 2	Horizontal	50 mm	
SSME No. 1, -Z Side	Horizontal	50 mm	
SSME No. 3	Horizontal	50 mm	
Overall SSME Cluster	Horizontal	50 mm	+Y Side

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Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - MLP (continued)

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ UMB Area	Horizontal	35-70 mm	
LH ₂ UMB Area	Horizontal	35-70 mm	
ET/ORB UMB & ORB Lower Surface	Horizontal	28 mm	From under ET

*** End of Table 80-2 Final Inspection Team - Telephotos ***

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Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
GO ₂ Vent Ducts	TELE	Horizontal	

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
-Y Bipod Ramp	Horizontal	TELE	From RSS
LO ₂ P/L Ice/Frost Ramps	Vertical	TELE	From RSS; 2 photos required
GO ₂ Seal/Hood	Horizontal	TELE	From RSS
GUCP	Vertical	TELE	
Fwd Half of SSV	Vertical	28 mm	From RSS
Entire Orbiter	Vertical	28 mm	From RSS

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
-Y Bipod Ramp & Jack Pad C/O's	Horizontal	TELE	

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Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	TELE	
Orbiter Aft Section	Vertical	35-70 mm	

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - MLP DECK

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	TELE	From West
ET Aft Dome	Horizontal	TELE	
Aft Hard Point Closeout	Vertical	TELE	
LH ₂ Tank	Horizontal	TELE	From North
LO ₂ Tank	Horizontal	TELE	From North
LO ₂ Tank	Horizontal	TELE	From East
LO ₂ F/L Bracket Bellows	Horizontal	TELE	XT - 1978 & XT - 1973
LO ₂ F/L Bracket	Horizontal	TELE	XT - 1871
LO ₂ F/L Bracket	Horizontal	TELE	XT - 1623
LO ₂ F/L Brackets	Horizontal	TELE	XT - 1377 & XT - 1129
LO ₂ F/L Brackets & Bellows	Horizontal	TELE	XT - 1129 & XT - 1108; from SE
LO ₂ P/L & C/T	Horizontal	TELE	From SE
Overall Orbiter Left Side	Vertical	28 mm	
ET -Z Side	Vertical	28 mm	
Overall Orbiter Right Side	Vertical	28 mm	
Overall SSME Cluster -Y Side	Horizontal	28 mm	

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Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - MLP DECK (continued)

Overall SSME Cluster +Y Side	Horizontal	28 mm	
ET/Orb UMB & Orbiter Lower Surface	Horizontal	28 mm	From under ET

*** End of Table 80-3 - Reduced Final Inspection Team Photos ***

*** End of Operation 80 ***

03-15-2002

03-15-2002
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APPROVED

03-15-2002

OPERATION 90 LO₂/LH₂ Drain Monitoring

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 4.0

NOTE

This operation is contingent upon progression of launch countdown and is performed after start of cryo (LO₂/LH₂) loading and subsequent launch scrub, FRF, or WCDDT.

Operation Not Performed: N/A

NOTE

This operation monitors the External Tank external surfaces during LO₂/LH₂ drain operations from time of detanking until 1.5 hours after LO₂/LH₂ low level sensors read dry via OTV 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171.

Noted requirements satisfied by this operation: OMRS S00E00.021

90-1 Record start date/time (GMT) of LH₂ and LO₂ Tank Drain.

LH₂ Drain Start Date 11-11-02 Time 05:20 GMT

LO₂ Drain Start Date 11-10-02 Time 04:00 GMT

ETM N/A ^{Richards} Date 11-10-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

90-2 CVM1 JTV1 223

From start of LO₂ Tank Drain and LH₂ Tank Drain until respective LO₂/LH₂ low level sensors read dry, **monitor** ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras. No cryogenic liquid or excessive vapors allowed.

ETM W. A. Richards Date 11-11-02
Richards Support: COMM

90-3 Record date/time (GMT) when LO₂/LH₂ low level sensors read dry.

LH₂ Sensors Dry Date 11-11-02 Time 0650 GMT

LO₂ Sensors Dry Date 11-11-02 Time 0630 GMT

ETM W. A. Richards Date 11-11-02
Richards

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

STARS, 603

90-4 CVM1 JTV1 223

Monitor ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras for 1.5 hours after LO₂/LH₂ low level sensors have read dry. No cryogenic liquid or excessive vapors allowed. Record date/time (GMT) when monitoring complete.

LH₂ Complete Date 11-11-02 Time 0820 GMT

11-11-02

LO₂ Complete Date 11-11-02 Time 0700 GMT

11-11-02

ETM Va KAD Date 11-11-02

RICHARDS

Support: COMM

WC
150
USA

Dev. 90
No. 01

SEE DEV

90-5 Completion of this operation satisfies noted requirements.

OMRSD S00E00.021

90-6 Operation - LO₂/LH₂ Drain Monitoring complete.

*** End of Operation 90 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SPRINT, 2002

OPERATION 100 Console Securing

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

100-1

CTIF	TBC	136
TBC	CTC	232

OTV support for ET thermal protection system evaluation no longer required.

100-2

CTIF JYVR 138

Perform the following:

1. Turn off video recorders.
2. Remove tape cartridges.
3. OTV support no longer required.

Support: COMM

100-3

CTIF	CVM1	222
	CVM2	

Secure consoles by setting all monitors to "Off" position.
Report completion.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Perform next step only after a successful launch.

100-4

CTIF

Remove photo processing laptop computer from Firing Room.

Not Performed:

ME
08

11-11-02

100-5

CTIF	TBC	136
TBC	CTC	232

Firing Room 2, ice frost monitoring area securing complete.

100-6

Operation 100 - Console Securing complete.

ME
08

ETM

Date 11-11-02

*** End of Operation 100 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

OPERATION 110 Summary Tape

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Observations/concerns observed during count are typically recorded on the summary tape real-time (trouble tape).

110-1 CICE

After launch or launch scrub, prepare a summary tape to include observations/concerns noted during count.

110-2 Operation Summary Tape complete.

ETM R Brewer Date 11/12/02

*** End of Operation 110 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
03-15-2002

OPERATION 120 Post Drain Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 2.0

NOTE

Post drain walkdown performed only after start of cryo (LH₂/LO₂) loading and subsequent launch scrub.

Operation Not Performed: N/A

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

Personnel shall wear **hardhats** and **flame retardant coveralls** while performing post drain walkdown.

NOTE

Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

Post drain walkdown performed in support of a 24 hour scrub turnaround is typically coincident with the L-20 hour pre-launch walkdown for the ensuing launch attempt.

03-15-2002
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NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

NASA Engr	(4)
SFOC Engr	(2)
LMSSC-LSS	(1)
Boeing LSS	(1)
SFOC Safety	(1)

- 120-1** NASA Lead ET Mechanical Systems Engineer (PH-H) verify essential personnel on station, properly attired, and ready to proceed with post drain walkdown.

Essential Personnel	
NASA Engineering (PH-H)	1
SFOC Engineering (ETM)	1

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NOTE

"Hands-on Investigation" is applicable only to those areas which are not understood or fully defined and which cannot be adequately evaluated otherwise.

120-2 Perform post drain walkdown as follows:

1. Visually inspect ET TPS exterior surfaces after detanking and warm-up (approximately T + 4 hours after drain is initiated) from the MLP, FSS, and RSS as access permits.
2. Perform hands-on investigation of all areas suspected of violating Doc: NSTS 08303 (LI) NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA (LI)

OMRSD S00E00.031

USA
141
VSN

3. Photograph any vehicle / facility concerns observed.

SPC No. 51361

Disc/Frame Nos: 1-23

120-3 Walkdown complete. All discrepancies identified. No constraints to continue. Forward description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

PH-H

[Signature]
PH-H
SPEECE

Date

11-11-02 ✓

ETM

[Signature]
RICHARDS

Date

11-11-02

120-4 Operation Post Drain Walkdown complete.

*** End of Operation 120 ***

03-15-2002
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APPROVED

SPARS, 003

OPERATION 130 Post Launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 3.0

NOTE

Do not perform this operation after launch scrub.

Operation Not Performed:

ME
08

11-11-02

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

Personnel participating in walkdown shall wear **hardhats** and **flame retardant coveralls**.

NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

NASA Engr	(3)
SFOC Engr	(2)
LMSSC-LSS	(1)
Boeing LSS	(2)
SRB ELE	(1)
Thiokol-LSS	(1)
SFOC Safety	(1)
Pad Mgmt Rep	(1)

OR
04

0011002

OPERATION 130 IS NOT PERFORMED. PAGES 130-3 THRU 130-5 HAVE BEEN REMOVED.

0011002

03-15-2002
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APPROVED

- 130-1 NASA (PH-H) **verify** following personnel on station, properly attired, and ready to proceed with post launch walkdown.

Essential Personnel		
NASA	PH-H	1
SFOC	ETM	1

NOTE

Post Launch Walkdown must be performed prior to washdown and Pad being opened for normal work.

- 130-2 Perform Post Launch Walkdown as follows:

1. Ref Table 130-1, **visually inspect** post launch pad/area to identify any lost flight or ground systems hardware and debris sources.
2. Ref Table 130-2, **document/SIMS photograph** launch PAD area configuration.

Description: Post Launch Walkdown

USA
1424

OMRSD S00U00.010-1

SPC No. N/A

Disc/Frame Nos: N/A

- 130-3 Walkdown complete. Debris sources and lost flight hardware identified. No constraints to continue. **Forward** description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

PH-H N/A Date N/A

ETM N/A Date N/A

- 130-4 Operation - Post Launch Walkdown complete.

03-15-2002
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03-15-2002

OPERATION 140 Film Review

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

This operation may be not performed after launch scrub.

Operation 140 Not Performed:

ME
08

11-11-02

NOTE

Analysis of Pad Debris Inspection Results determines priority for film review. All critical film (as determined by the Debris Team) must be reviewed as soon as possible after launch and no later than 36 hours prior to entry (of the Orbiter into the earth's atmosphere).

140-1 Review and analyze all engineering launch (and flight) film to:

- Identify any debris damage to the SSV
- Identify flight vehicle or ground system damage that could affect Orbiter flight operations of future SSV launches.

140-1

OMRSD S00U00.011-1

ETM N/A Date U/A

140-2 Operation - Film Review complete.

ETM N/A Date N/A

*** End of Operation 140 ***

03-15-2002
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03-15-2002
2002

OPERATION 145 IR Camera Removal

Shop: PH-H

Cntrl Rm Console: NA

OPR: ETM

Zone: NA

Hazard (Y/N): N

Duration (Hrs): 2.0

WARNING

Hard hats required on the Pad when SSV is not present.

CAUTION

Exercise care to avoid dropping equipment, fasteners, etc from RSS roof to prevent damage to equipment or injury to personnel. All tools must be tethered.

NOTE

IR Camera removal from RSS Roof site may be not performed in launch scrub turnaround scenarios.

145-1 **Remove IR camera at RSS Roof Site as follows.**

1. **Remove** fasteners (2 pl) from camera housing front. **Retain** fasteners for reinstallation when front cover is installed.
2. **Install** camera housing front cover using previously removed fasteners (2 pl). **Tighten** fasteners (2 pl) wrench tight.

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back cover.

3. **Rotate** camera housing back cover into open position by removing bolts with flat washers (20 pl). **Retain** bolts/washers for reinstallation.
4. **Disconnect:**
 - Power cable
 - Pan & tilt cable
 - Controller cable
 - OTV coaxial cable
5. **Unlock** spring pin at lower, left to release IR camera Unit in camera housing. **Remove** IR Camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. **Support** IR Camera Unit during removal.
6. **Rotate** camera housing back cover into closed position. Do not pinch cables. **Secure** back cover by reinstalling bolts/flat washers (20 pl). **Tighten** bolts wrench tight.

03-15-2002
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OMI S6444 J04
APPROVED

STANLEY
2003

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear N-Dex nitril gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 05-22-01

7. Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol.
8. Route IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H _____ Date _____
USA ETM _____ Date _____

Not Performed: 

ET/03

77-77-02

NOTE

IR Camera removal from Camera Site 2 may be not performed in launch scrub turnaround scenarios.

145-2 Remove IR camera from Camera Site 2 as follows.

1. Remove bolt(s) from camera housing front. Retain bolt(s) for reinstallation when front cover is installed.
2. Install camera housing front cover using previously removed bolt(s). Tighten bolt(s) wrench tight.

2010

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back cover.

3. **Loosen** screws (8 pl) securing camera housing back cover using Phillips screwdriver. **Rotate** camera housing back cover to open position. **Retain** bolts/washers for reinstallation.
4. **Disconnect:**
 - Power cable
 - Pan & tilt cable
 - Controller cable (2 pl)
 - OTV coaxial cable
5. **Unscrew** set screw(s) at lower, left/right to release IR camera Unit in camera housing. **Remove** IR camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. **Support** IR camera Unit during removal.
6. **Coat** camera housing back cover O-ring with a single coat of (1) tube/jar 6505-00-133-8025 Petroleum Jelly, Vaseline (or equivalent) .
7. **Rotate** camera housing back cover into closed position. Do not pinch cables. **Secure** back cover by installing screws (8 pl). **Tighten** screws wrench tight using Phillips screwdriver.

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WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear **N-Dex nitril gloves** and **chemical splash goggles**. When working at eye level or above wear a **face shield** over goggles.

WS002.a 05-22-01

8. Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymply cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol .
9. Route IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H _____ Date _____
USA ETM _____ Date _____

Not Performed:

ET/03

11-11-02

*** End of Operation 145 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

OPERATION 150 Final Report

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

This operation may be not performed after launch scrub.

Operation 150 Not Performed:

ME
08

11-11-02

- 150-1** Assemble final report by attaching following reports to this OMI.
Reference each to this step.

Post Launch PAD Assessment
SRB Assessment
Launch Film Review
Launch Day Video Review
Orbiter Landing Assessment
ET Separation Review

- 150-2** Final report assembly complete.

ETM N/A Date N/A

- 150-3** Operation - Final Report complete.

*** End of Operation 150 ***

SECRET

(SPC)
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